Arithmetic Progression (A.P.)-1

1) If the sum of the first 2n terms of an A.P. 2,5,8,….. is equal to the sum of the first n terms of the A.P. 57, 59,61….. then find the value of n. **(IIT 2001)**
2) Find the sum of all integers from 1 to 100 that are divisible by 2 or 5 **(IIT 1984)**
3) If difference between any two consecutive interior angles of a polygon is 5°. If the smallest angle is 120°, find the number of the sides of the polygon.**(IIT 1980)**
4) If mth term of an AP is 1/n and nth term of the same AP is 1/m then prove that its mn th term is equal to 1. **(IIT 1998)**
5) Find the sum of odd integers from 1 to 2001.
6) Find the sum of all natural numbers lying between 100 and 1000, which are multiples of 5.
7) In an A.P., the first term is 2 and the sum of the first five terms is one-fourth of the next five terms. Show that 20th term is –112.
8) How many terms of the A.P. – 6, 11 2 − , – 5, … are needed to give the sum –25?
9) In an A.P. if p th term is 1/q and q th term is 1/p , prove that the sum of first pq terms is $\frac{1}{2}$ (pq +1), where p ≠ q.
10) If the sum of a certain number of terms of the A.P. 25, 22, 19, … is 116. Find the last term.
11) Find the sum to n terms of the A.P., whose k th term is 5k + 1.
12) If the sum of n terms of an A.P. is ($pn + qn^2$), where p and q are constants, find the common difference.
13) The sums of n terms of two arithmetic progressions are in the ratio
5n + 4 : 9n + 6. Find the ratio of their 18th terms.
14) If the sum of first p terms of an A.P. is equal to the sum of the first q terms, then find the sum of the first (p + q) terms.
15) The ratio of the sums of m and n terms of an A.P. is $m^2 : n^2$. Show that the ratio of mth and nth term is (2m – 1) : (2n – 1).
16) If the sum of first n terms of an A.P. is $3n^2 + 5n$ and its mth term is 164, find the value of m.
17) Insert five numbers between 8 and 26 such that the resulting sequence is an A.P.
18) Between 1 and 31, m numbers have been inserted in such a way that the resulting sequence is an A. P. and the ratio of 7th and (m – 1)th numbers is 5 : 9. Find the value of m.
19) A man starts repaying a loan as first instalment of Rs. 100. If he increases the instalment by Rs 5 every month, what amount he will pay in the 30th instalment?
20) Prove that if fourth power of the common difference of an A.P. is added to the product of any four consecutive terms of it then the resulting sum is always the square of an integer. (**IIT 2000)**
21) How many terms of the sequence 18, 16, 14, ... should be taken so that their sum is zero?

22) Find the common difference of an A.P. whose first term is 100 and the sum of whose first six terms is 5 times the sum of the next 6 terms.
23)The 8th term of an A.P. is 37 and its 12th term is 57. Find the A.P.
24) Find the sum of the first 25 terms of an A.P. whose $n\ th$ term is given by $t_n = 7 - 5n$.
25) Find 10th term from end of the A.P. 4, 9, 14, ... 254.
26) Find the number of terms of the A.P. 54, 51, 48 ... so that their sum is 513.
27) If the $n\ th$ term of an A.P. is (2n + 1), find the sum of first n terms of the A.P.
28) Find the sum of all two-digit odd positive numbers.
29) The $8th$ term of an Arithmetic progression is zero. Prove that its $38th$ term is triple its $18th$ term.
30) The 6th term of an Arithmetic Progression (AP) is −10 and the term is −26. Determine the 15th term of the AP.
31) Find the sum of all the two-digit natural numbers which are divisible by 4.
32) The 5th term of an Arithmetic Progression (A.P.) is 26 and the 10th term is 51. Determine the 15th term of the A.P.
33) Find the sum of all the natural numbers less than 100 which are divisible by 6.
34) Find the sum of first 25 terms of an A.P. whose nth term is $1 - 4n$.
35) If the sum of first n terms of an A.P. is given by $S_n = n(n + 1)$, find the 20th term of the A.P.
36) Which term of the A.P. 72, 68, 64, 60, … is zero?
37) How many terms of the A.P. 17, 15, 13, 11, … must be added to get the sum 72? Explain the double answer.
38) In an A.P., the sum of its first n terms is $n\ 2 + 2n$. Find its 18th term.
39)The first term, common difference and last term of an A.P. are 12, 6 and 252 respectively. Find the sum of all terms of this A.P.
40) Which term of the A.P. 3, 15, 27, 39, … Will be 132 more than its 54th term?
41) How many three-digit natural numbers are divisible by 7?
42) Find the sum of all three-digit whole numbers which are divisible by 7.
43) For what value of n are the $n\ th$ terms of two Aps 63, 65, 67, … and 3, 10, 17, … equal?
44) If m times the mth term of an A.P. is equal to n times its $n\ th$ term, find the $(m + n)\ th$ term of the A.P.
45) In an A.P. the first term is 8, $n\ th$ term is 33 and sum of first n terms is 123. Find n and the common difference.
46) In an A.P., the first term is 25, $n\ th$ term is – 17 and sum to first n terms is 60. Find n and d, the common difference.
47) In an A.P., the first term is 22, $n\ th$ term is – 11 and sum to first n terms is 66. Find n and d, the common difference.
48) Find the 10th term from the end of the A.P. 8, 10, 12, ……, 126.
49) The first term of an A.P. is p and its common difference is q. find its $10th$ term.
50) The $n\ th$ term of an A. P. is $6n + 2$. Find its common difference.